

NOCSAE Chest Protector Standard for Commotio Cordis

At the NOCSAE standards meeting in January 2017, NOCSAE officially finalized the world's first performance standard for chest protection from commotio cordis.

About Commotio Cordis

Commotio cordis, a heart rhythm disruption caused by a blow to the chest, is one of the leading causes of sudden cardiac death in athletes. The condition is an episode of ventricular fibrillation induced by a direct blow to the chest over the heart during a specific portion of the heart's electrical cycle. This can be caused by a direct hit from an object such as a baseball or lacrosse ball, a lacrosse stick or even a collision with another player. The impact doesn't have to be hard or high velocity. Approximately five to 15 athletes die every year from this event. Most of these deaths are males under the age of 14, some of whom were wearing a form of chest protection.

NOCSAE's Role

In conjunction with research efforts by the [Louis J. Acompora Memorial Foundation](#), NOCSAE has funded more than \$1.1 million in research to discover the precise cause of commotio cordis and then determine how to protect against it. Through a series of NOCSAE funded studies, Dr. Mark Link, M.D, was able to pinpoint the precise cause of commotio cordis, including the critical moment of occurrence in the cardiac cycle. With funding from NOCSAE, research engineers Cynthia Bir, Ph.D, and Nathan Dau, Ph.D, at Wayne State University were able to develop a mechanical chest surrogate that would mimic the response of the human chest and heart to testing impacts. With the identification of an injury prevention threshold by Dr. Link and laboratory validation of the mechanical chest surrogate, NOCSAE was able to develop the world's first chest protection standard specific for commotio cordis. Equipment certified to this new standard is expected to significantly reduce the risk of injury and death from commotio cordis.

The new standard currently is specific only to baseball and lacrosse, but plans are being developed to include other sports such as softball and ice hockey.

Next Steps

The chest protector performance standard is scheduled to become effective in January 2018. The new standard is a recommendation for manufacturers, but with support from US Lacrosse, NOCSAE is hopeful that compliance with the standard will become part of lacrosse playing rules, and that eventually baseball playing rules will also incorporate compliance with this standard.

Prevention

Even the best protective equipment cannot prevent all such injuries, so it is important for coaches, parents, players and bystanders to be able to recognize the danger if an athlete is struck in the chest and collapses. Without immediate efforts to resuscitate the victim with an automated external defibrillator (AED), death can occur within just a few minutes. Commotio cordis can be fatal, and it is not related to an existing heart condition. Younger athletes, typically males 14 and under, are more vulnerable to commotio cordis. Coaches, parents and athletes who have access to an AED and training in CPR will help prevent tragic outcomes from commotio cordis. When an AED is used within three minutes of a collapse, survival rates are as high as 89 percent.

Resources for Commotio Cordis

- [Louis J. Acompora Memorial Foundation](#)
- [American Heart Association, Dr. Mark S. Link: Commotio Cordis](#)
- [American Heart Association/American College of Cardiology Scientific Statement](#)
- [Korey Stringer Institute](#)
- [US Lacrosse](#)

